

STORMS AND WEATHER WARNINGS

WASHINGTON FORECAST DISTRICT

Few disturbances crossed the country during June and those that did were of slight or moderate intensity. Consequently no storm or small-craft warnings were issued for the Atlantic and east Gulf coasts.

Advisory warnings were issued, however, during the 20th-22d in connection with a tropical disturbance of slight intensity that moved inland over Mexico in the vicinity of Tampico. Pressure fell gradually over the northwestern Caribbean Sea during the 15th-17th, the decrease in that time amounting to 0.14 inch at Tela, Spanish Honduras, and Belize, British Honduras, and 0.04 inch at Swan Island. A further slight decrease took place at these stations on the 18th. By the 19th this decrease in pressure had reached the southwestern portion of the Gulf of Mexico and on the morning of the 20th Tampico, Mexico, reported a barometer reading of 29.68 inches and Brownsville, Tex., 29.74 inches. Rain set in along the Texas coast during the night of the 19th-20th, and excessive rainfall occurred at Brownsville and Corpus Christi on the 21st. The disturbance was moving slowly west-northwestward across the Bay of Campeche during this period and it moved inland during the 21st-22d. Heavy rains occurred at several Mexican stations. No strong winds were reported in connection with the disturbance.

No frost warnings were issued, except for the interior of northern New England on the 9th, and for the cranberry bogs of New Jersey on the 4th, 5th, 7th, and 9th.—*Charles L. Mitchell.*

CHICAGO FORECAST DISTRICT

The month was marked by rapid movement of storm areas across the region, with frequent rains, except in the extreme western portion, and with changeable temperature which averaged, on the whole, considerably below the normal, except in the Far Southwest. The frequency of storms and lack of sunshine prevented the temperature from maintaining high maxima, except for brief periods. The month was, therefore, abnormal, in point of rainfall and coolness.

However, except for a few local squalls, no storm caused winds of a marked character on the Great Lakes until toward the close of the month. A disturbance which developed in the Far West was centered on the morning of June 28 in Iowa. This storm moved northeastward to Ontario and the St. Lawrence Valley directly across the Great Lakes, and was attended by fresh to strong winds, severe squalls, and tornadoes from the Middle Mississippi Valley eastward over the Lake Erie district. Small-craft warnings were ordered for all Lake stations on the morning of the 28th, with advice that the winds would be fresh and strong and accompanied by squalls. On the morning of the 29th north-west warnings were ordered hoisted on Lakes Erie, Ontario, and southern Huron.

Frost warnings were issued on the 7th and 9th for localities in the Northwest and at various times during the month for the cranberry marshes in Wisconsin. The season in the marshes was unusually late, preventing the vines from developing normal growth.

Special forecasts were issued daily in the interests of the fruit growers of Door County, Wisconsin, and of southwestern Lower Michigan.

Fire-weather forecasts were forwarded daily to the Forest Service officials in western Montana.

A special forecast was made for southeastern Lower Michigan on June 22d, in connection with the aerial fox and hounds race conducted by the Detroit Free Press. It served its purpose, as shown by the following statement from Mr. Norman B. Conger, meteorologist, Detroit, Mich.:

The winds from the southwest prevailed during the time of the flight, as forecast.

Mr. Ralph Upson, who had charge of the balloon flights, and the Free Press force, were enthusiastic in their thanks for the information furnished.

—*H. J. Cox.*

NEW ORLEANS FORECAST DISTRICT

After the 10th, dry, hot weather prevailed in much of the district; but this condition was broken by showers and cooler weather for a few days at the beginning of the last decade and again at the close of the month. Areas or troughs of low pressure, moving east or northeast, were generally shallow and most of them were attended by little or no precipitation in the district.

On the 20th-21st, during the moderate disturbance in the Gulf east of Tampico, Mexico, described under Washington Forecast District, winds on the Texas coast blew rather persistently from the southeast and were stronger than at other times during the month, partaking somewhat of the character of moderate thundersqualls. Small-craft warnings were displayed on the 21st in the Corpus Christi district by the Weather Bureau official at that place and were justified.—*R. A. Dyke.*

DENVER FORECAST DISTRICT

Frost warnings were issued for the colder agricultural districts of Utah and western Colorado on the morning of June 7, on the morning of the 8th for Utah and southwestern Colorado, and again on the morning of the 9th for eastern Utah and southwestern Colorado. In each case these warnings were justified, as indicated by reports either of the actual occurrence of frost or of temperatures considerably below the critical point for frost formation. The coldest at Modena, Utah, was 2° above freezing, while at Durango, Colo., a temperature of 33° was recorded on the mornings of the 8th and 10th and of 32° on the morning of the 9th.

The cause of these low night temperatures was the development of a pronounced low-pressure area, the center of which passed eastward across the northern portion of the district, and the approach of an area of high pressure from the north Pacific States and adjacent Canadian Provinces, areas between which the pressure gradient was steep and temperature contrasts marked.

On the evening of Tuesday, the 17th, a fire-weather warning was issued to include the forested districts of Utah, Arizona, and New Mexico, forecasting strong westerly winds, local electric storms, and cooler weather, for Wednesday, the 18th, and probably Thursday, the 19th. The occasion for issuing the warning was that the fire hazard had become great, due to a deficiency of precipitation and to a week of unusually high temperatures, while a low-pressure area had developed marked intensity and showed that it was moving eastward. On the following day wind velocities reported by Weather Bureau offices and Forest Service lookout stations ranged from brisk winds to fresh gales. A velocity of 46 miles per

hour from the southwest was reported from Albuquerque, N. Mex., and from the Bill Williams Lookout Station, Ariz. By the 19th the wind subsided. It seems probable that local electric storms occurred within the more elevated forested districts, from which only a few reports are available at present.

Fire-weather warnings were issued again on the evening of Monday, the 23d, for fresh to strong winds, mostly westerly, for Tuesday, the 24th, to include Utah, northern Arizona, and northern New Mexico, and strong shifting, mostly westerly winds for Colorado, with thunderstorms probable in northeastern Colorado. This warning was occasioned by a low-pressure area over the plateau and Rocky Mountain regions, which was spreading and drifting eastward. Forests had continued very dry and inflammable and meteorological conditions indicated further and serious fire hazard. On the following day fresh to strong winds were reported at different points in the district, and local thunderstorms, generally without appreciable precipitation, occurred in eastern Colorado. Information was received through the press and cooperative observers of damage from wind, hail, and lightning in northeastern Colorado, one man having been killed by lightning and two others injured.—*Lawrence C. Fisher.*

SAN FRANCISCO FORECAST DISTRICT

The warm wave which prevailed over this district at the close of May continued until the 5th, and was broken on the 6th, when a depression moving through western Canada caused rain in the north Pacific states. Seasonable weather then prevailed, until another depression moving over western Canada gave rain in the northern portion of this district on the 17th, and 18th, with cooler weather.

A warm wave began to develop over this district on the 19th, and slowly increased in intensity until the end of the month. On the 30th, June records for high temperatures were broken at Walla Walla, Baker and Winnemucca.

Fire-weather warnings were issued throughout the district on the 19th, and 26th. Cautionary fire-weather warnings were distributed by radio broadcast from the 1st to the 5th, and from the 19th until the close of the month.

Special flying-weather forecasts along the coast were made for the Navy, from San Pedro to Port San Luis on the 27th, and from Port San Luis to San Francisco on the 28th.—*G. H. Willson.*

627.41 (73) RIVERS AND FLOODS

By H. C. FRANKENFIELD, Meteorologist

There were no flood stages reached in the rivers of the Atlantic States during the month of June except for a single day, June 27, in the Santee River of South Carolina. Warnings were promptly issued after the heavy rains of June 24 and 25. No damage was done.

The Black Warrior River of Alabama was in flood near the end of May, and warnings were issued on May 29 for a flood in the Tombigbee River from Demopolis, Ala., to the mouth. Flood stages were reached on June 2 and continued for five days, with a crest at Lock No. 4, Demopolis, of 42.8 feet on June 4, 3.8 feet above flood stage. Only lowest bottoms were overflowed, about 3,300 acres, involving a loss in prospective crops of \$23,500, and in suspension of business operations, \$1,000. Value of property saved through warnings, \$9,300.

During the month of May rains had been frequent and at times heavy over Ohio, Indiana, and Illinois with resulting floods. The same conditions continued during the first decade of June. Naturally the soil was well saturated and the first heavy rain brought about another rapid rise in all rivers, very few failing to exceed the flood stage. The floods, however, were moderate except in some of the smaller tributary streams in the State of Ohio, and as a rule only lowlands were flooded, and without damage of consequence. The only severe flood occurred in Mad River, a tributary of the Great Miami River of Ohio. In this river the flood did much damage, particularly along the Buck Creek section of the city of Springfield. Two hundred homes were flooded, steam and electric railroad service crippled, bridges washed away, crops destroyed, livestock drowned, and business retarded. The rain fell so rapidly that drainage ditches and sewers were overtaxed. The losses reported amounted to \$535,000, of which \$50,000 was in farm and truck products. The effectiveness of the Miami Conservancy project was again strikingly illustrated in the City of Dayton and below. The dams easily withstood the enormous pressure and triumphantly survived their greatest test since their completion.

There was, of course, some minor damage done below Dayton, mainly to lowlands without levee protection. Above Dayton, however, all tributary streams were out of their banks and great damage of the usual character was done. One of the largest items of expense was for the removing of immense masses of debris brought down by the flood waters.

The city of Piqua, on the main river, suffered severely through the collapse of the city waterworks raceway, flooding much of the western portion of the city, and compelling the suspension of railroad operations. The water supply from Piqua northward to Sidney was also cut off for a time.

Losses to crops in the Miami Valley were estimated at \$1,000,000, much of it through inundation of crops planted in storage territory behind the conservancy dams, an occurrence that should be and is expected at times.

The floods in Indiana and Illinois were moderate as a rule, although prospective crop losses, 18,000 acres of wheat and corn, were estimated at \$220,000, while suspension of business caused other losses of about \$25,000. The money value of property saved through flood warnings was about \$25,000.

For the first time since 1909 the Maumee River of Ohio reached the flood stage of 15 feet during the month of June. No warnings were necessary and no damage resulted.

Another destructive local flood occurred during the evening of June 13 in Carter County, Tenn., mainly along the upper Watauga River. Between 11 and 15 inches of rain fell within a few hours over a small portion of the narrow valley, drowning eleven persons and doing damage to the amount of \$500,000. Six miles from the locus of the heaviest rain the fall was only 1 inch, and 15 miles away in another direction only from 0.50 to 1.60 inches.

The Tallahatchie River of Mississippi was in flood from June 6 to 27, inclusive, and about 30,000 acres of land, mostly uncultivated, were overflowed. Only nominal damage was done.

The Mississippi River at Keokuk, Iowa, passed the flood stage of 14 feet on June 29 for a single day, and at the close of the month was above the flood stage from Hannibal, Mo., to the mouth of the Missouri River at Alton, Ill. Moderate flood stages also prevailed for a